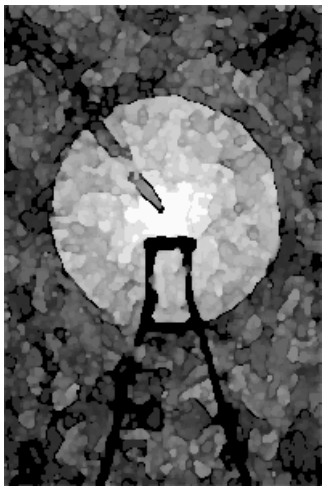
ARCHDIOCESE OF SEATTLE
CATHOLIC SCHOOLS



An Alliance of
North Seattle Deanery
Catholic Middle Schools

Presents:

# *The 2010 Middle School Science Fair*

Thursday
March 25, 2009

Held at the Bishop Blanchet High School
8200 Wallingford North, Seattle, WA 98115

**Guiding Principles for the Alliance of North Seattle Deanery of Catholic Schools Middle School Science Fair**

Mission: In 2004, an Alliance of interested North Seattle Deanery Catholic Schools planned and implemented a 2005 Middle School Science Fair. The goal was to enrich science education in our schools by providing an opportunity for interested students to participate in a science fair contest judged by scientists in our community. We emphasized and advocated that this was a student-driven project to foster an interest in "inquiry based science" and all students interested in participating were to be supported.

Who can participate: Middle school students (6th, 7th and 8th graders) who attend one of the North Seattle Deanery Catholic Schools may enter a project as a team of one or two students. All interested participants are welcome.

Process: Distribute a common set of Science Fair project guidelines, rules and judging criteria to each interested school in the fall. Each school is responsible for administering their own program to educate and support their students in all aspects of completing a science fair project.

Guiding Committee: A guiding committee was formed in 2004 which consisted of at least one representative from each participating school. The committee met to discuss the development of a fair, effective, beneficial science fair event. This committee is responsible for discussing the following issues each fall:

1. (Spring) Identify a school to host the event the following year.
2. (Spring/Fall) Identify/Confirm a date in March/April to conduct the fair. The date selected should occur after the deadline for individual school science fairs.
3. (Fall) Update and approve the science fair project guidelines.
4. (Fall) Establish a list of interested schools that will participate. The hosting school will distribute letters to each school in the North Seattle Deanery of Catholic Schools to inquire about interest in participating in the joint science fair.
5. (Fall) Collect and maintain funds to host the science fair event. Funds will go to purchasing awards and producing event programs. The required contribution fee for each school will be determined by the funds needed from the previous year.

Judging: All of the schools will help identify judges. The judges should be selected from people in the scientific and teaching community or people with a strong interest in science. The committee will approve judge participation. Each project will be judged by 3 judges.

The judges will use the rubric on pages 9 and 10 to rate each project. Students will be interviewed for about 10-15 minutes by each of the judges that review their projects.

Awards: The awards will be based on the number of entrants. A 1st, 2nd, and 3rd place winners will be selected for each grade. In addition, honorable mention awards may be given. Judges will also be authorized to present "special awards". All participants will receive a Certificate of Participation.

## What to Expect on the Day of the Fair

**Event Schedule:**

3:30-4:00pm: Set-up Projects

4:00-4:30pm: Public Viewing of Projects
Judges Meeting

4:30-6:00pm: Judging (independent judging/interviews. Each student judged by 2-3 judges); Students, Judges & Volunteers ONLY

6:00-7:00pm: Public Viewing of Projects
Tallying of Judge's scores

7:00-7:30pm: Awards Ceremony

7:30-8:00pm: Public Viewing of Projects- attendees finish viewing projects

# GETTING STARTED AND STAYING ORGANIZED

**The number one problem students have with their science fair project is organizing their time.** It will be very important that you get started **early** and work on your project throughout the time period so that you are not trying to get it done at the last minute. Below you will find a check list you can use to keep yourself organized over the many weeks necessary to complete a quality project.

| STEP | TASK | DATE COMPLETED |
|---|---|---|
| 1 | Choose a topic. This is an area of science that you are interested in exploring. | |
| 2 | Develop your scientific question and hypothesis. Start your journal to record progress as you go. | |
| 3 | Begin gathering resources and information, and begin designing experiments. | |
| 4 | Gather materials, set up and run your experiments. Begin collecting and recording data. | |
| 5 | Continue recording data as necessary. Depending upon your experiment, it may take a couple of hours, or weeks. | |
| 6 | Begin designing display board. | |
| 7 | Begin assembling display, graphing data, and writing conclusions. | |
| 8 | Design charts, graphs, and finalize writing for display. | |
| 9 | Finalize display and related study report. | |

# SELECTION, DESIGN AND DEVELOPMENT OF YOUR SCIENCE PROJECT

Your job is to develop a question in science that your science fair project will test and attempt to answer. The key is to come up with a question in science that interests you. Then you will plan and create an *experiment*, instead of merely building a model or reporting on a subject in science. Since you will be spending a great deal of time on this experiment (many days, weeks or even months), it is very important that you choose a science subject that really interests you. Do not limit yourself! Consider all of the science disciplines:

*Astronomy* *Chemistry* *Biology* *Physics* *Health Services*
*Botany* *Engineering* *Geology* *Microbiology* *Ecology*

**Science Journal**: Start a science journal right away! This is a descriptive record of how you went about the project, what you found out, what it means, what it makes you think, what you want to do next, etc. Everytime you work on the project, even if it's just ideas for what you might do, how you might change a procedure or what you think might happen, write a note about this. Make sure that all your entries are dated. Include a seperate page labeled "Budget" where you account for all money spent on the project.

**Developing a Question:** This is a crucial step! If you do not have a good question, a good experiment is unlikely to follow. Strong experimental questions usually begin with "do", "does", "are", or "is." There are exceptions, though this is a good place to begin. In general, questions that start with "why", "how" or "what" should be avoided, since these tend to ask for information, but aren't as good for designing an experiment.
Ask questions that allow you to make comparisons –
For example; the effectiveness of competing products, differences in strength, time of day, type of species, amount of water or light or soil, etc. Remember to ask a question that you can realistically solve through experimentation. It shouldn't be too broad or too difficult, but it shouldn't be a simple question with an answer that most people already know.

For example, "Does soil type impact the growth of tulips?" is a good question, and the question sets up a logical set of experiments that you can complete in order to determine an answer.

Here are a few examples of well-worded questions that lead to stronger, more focused experiments:

- Do commercial water filters remove bacteria equally?
- Does the blood-sugar level of middle school students impact their ability to concentrate?
- Is there a difference in the effectiveness of popular stain removers?
- Do certain fish learn by association?
- Are there differences in strength between various bridge designs?
- Do various types of music affect the blood pressure of people?
- Is there a difference in effectiveness between mouthwashes?

**Gather Resources:** There are many books and on-line resources available to give you ideas on science fair projects and experiments. There are also many people that can help you get started and guide you along the way. Some examples include: teachers in middle and high schools, high school students, university students and professors, local scientists, family members and neighbors. You are solely responsible for your experiment, but obtaining assistance can be very useful.

**Hypothesis:** A hypothesis is an educated guess that you make attempting to answer your question *before* you do any of your experimenting. A good hypothesis has two parts: what you think and why you believe this. For example, "I think soil type will affect tulip growth because

different soils contain differing amounts of nutrients that the tulip needs to grow." To the extent that it is possible and practical you should investigate what is already known about your question. In your science journal, document any resources you use.

**Design and Carry Out Experiment:** Design your experiment to test your hypothesis. It is important that your experiments include **controls** and **variables** and you are able to repeat the experiment more than once and produce the same results. **A control is a group or condition that does not vary in your experiment and can be used to compare with your experimental groups/treatments. A variable is a factor that can change.** For example, your scientific question may be: "Does the type of soil impact the growth of tulips?" In this case you would choose different soils to test and compare to a "control" soil. The different soil types are the variables.

Make sure to include a *complete* list of all of your **materials** that you use in your experiment and keep a specific **procedure**. The procedure is "recipe cookbook" step-by-step instructions explaining how to perform your experiment. Your procedure is complete if anyone wanting to repeat your experiment could do so using your instructions.

**Gather Data:** Every step of your experiment should be documented. This requires that you keep detailed numerical data and descriptive observations. For example, "March 2, Day #20 – measured tulip growth and added water to all plants." Photos and graphs can be generated from your data to present your findings and convey scientific accuracy.

**Data Analysis, Conclusion:** Once your experiment is completed, go back over your data and observations to interpret what you found. You may need to graph your data and perform some sort of analysis to determine if your results are significant. That means "Is there too much variation in your data to draw a conclusion?" Summarize all of your data to form a conclusion. **You should remember to restate your original hypothesis and state how your results support it or not.** Your conclusion may also suggest variables that may have affected results that you could not control and suggestions for further testing.

**Process Analysis**: Provide a written response (less than 1 page each) addressing the following topics:

1) My method of research was (outline what you did and why)….
2) The best part about this project was….
3) The next time I do a research project I will….
4) I could have improved this project by….
5) What I learned from this experience was….
6) How can a future study or project be created from mine?

SOURCES


http://www.cdli.ca/sciencefairs/ and click on the "Intermediate Projects"
http://www.juliantrubin.com/fairguide.html
http://www.scienceproject.com/
http://pbskids.org/zoom/activities/sci/
http://faculty.washington.edu/chudler/chvision.html
http://faculty.washington.edu/chudler/experi.html
http://www.all-science-fair-projects.com/category0.html
http://www.scifair.org/ideas/DrShawnsAmazingList.pdf

# Preparing your Display

Scientists must be able to effectively communicate their ideas, results, and learning to others. You will accomplish this through your visual display and through your related study report.

Remember: **Make your display reflect your pride in your hard work!**

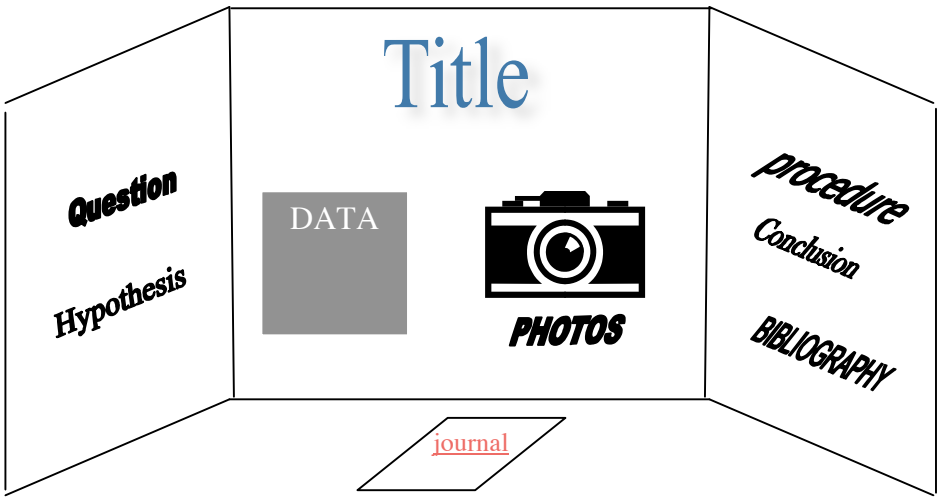
**Your Display Should:**

- Attract attention.
- Interest the viewer in taking a closer look at your work.
- Communicate that you have taken your investigation seriously and invested time in it.

**Helpful Hints:**

- USE COLOR, but not too many; 2 or 3 colors is good enough.
- Think of an INTERESTING TITLE and make it large enough to read from a distance. Do not include conclusions in the title.
- MAKE SURE WORDING IS STRAIGHT, EASY TO READ, AND SPELLED CORRECTLY.
- DON'T USE TOO MUCH GLUE; it will wrinkle the paper.
- If possible, DISPLAY LAB SET UP with your presentation. If this is not possible, take pictures or make drawings of your set-up, and place them on your board.
- BE CREATIVE, but don't let your creativity overshadow the science.

**HAVE FUN!**



# Contest Rules and Regulations

Only entries that follow the guidelines below will be accepted, so it is important to keep them in mind as you carry out your project.

- **Scientists** – The project must be completed by one student working independently or by a team of two students. Parents, guardians, and teachers may only advise students on their projects. The projects must be developed and carried out by the students.

- **Display** – Display boards should be 3' high by 5' wide or smaller. **Oversized boards will be disqualified.** All work must fit on or in front of the board. No electricity or water will be provided. Your display will be limited to 3 feet of table space. No open flames or burners will be permitted at the fair. No open flames or burners may be used in the display.

- **Judging** – Judging will be done by outside officials. All judges' decisions are final. After projects are checked in for judging, no changes may be made.

- **Live Animals** – All animal use must be in compliance with Washington State Law. Check with science fair personnel before using any animals. No live animals will be permitted at the fair (this includes invertebrates).

- **Budget** – No more than $50 may be sent on the project. This includes the display. All money spent on the project must be documented in the science journal.

- **Health & Safety** –
  - No poisonous animals, pathogenic or carcinogenic materials, hypodermic needles, explosives, body fluids, flammables, poisonous chemicals or other dangerous materials may be used. Open flames, burners, lasers, x-rays, ultraviolet, or infrared radiation may be used during the project only under adult supervision. They cannot be part of the display.

  - No live cultures of any kind are permitted. If your project involves the use of bacterial cultures please use pictures of the cultures at your display.

  - All moving parts must be securely mounted and construction must be durable so that it does not fall over-off during judging or viewing.

- **Science Journal** – Each project **must** include a science journal as described under "Selection, Design and Development of your Science Project." This report must be the original work of the scientist(s) involved. This journal should not be attached to the board, but presented on the table in front of it.

This document was adapted from the Seattle Public Schools document used for their 2002 Middle School Science Fair.

# JUDGING CRITERIA

**Total Points: _____ (out of 70 possible)**

**Student Name: _____** **Project #: _____**

**Grade: _____** **Judge #: _____**

## PROJECT OBJECTIVES (10 points)

Originality of investigation (5)

| Great idea, very original | | Good idea, some originality | | Keep working on originality |
|---|---|---|---|---|
| 5 | 4 | 3 | 2 | 1 |

Clearly stated question (5)

| Very clear. An informed layperson would understand the objectives. | | Reasonably clear. An informed person would need minor clarification. | | Keep working on clarity. |
|---|---|---|---|---|
| 5 | 4 | 3 | 2 | 1 |

## PROJECT IMPLEMENTATION (10 points)

The experiment addresses the question and is clearly explained (5)

| The explanation clearly and accurately relates the experiment to the central question | | Reasonable explanation of the experiment. Relationship between question and experiment | | Question is not well addressed by the experiment. Explanation of the experiment needs development. |
|---|---|---|---|---|
| 5 | 4 | 3 | 2 | 1 |

Clearly defined variables and controls (5)

| Student can clearly and readily define and explain variables and controls (as appropriate). | | Student is somewhat vague in their ability to define and explain variables (as appropriate). | | Little evidence of the ability to define and explain variables (as appropriate). |
|---|---|---|---|---|
| 5 | 4 | 3 | 2 | 1 |

## DATA COLLECTION (10 points)

Repetition of experiment to support validity of the conclusions (5)

| The number of trials preformed is sufficient to support the conclusions . | | Slightly more trials were needed. | | Not enough trials (e.g., 1) were made to support the conclusions that were drawn |
|---|---|---|---|---|
| 5 | 4 | 3 | 2 | 1 |

Results are measurable (5)

| Measurement is well used in the interpretation of experimental results. | | Use of measurement is a little shaky. | | Measurement was not well used in this experiment. |
|---|---|---|---|---|
| 5 | 4 | 3 | 2 | 1 |

## DATA INTERPRETATION (10 points)

Data are presented in a graphic form (charts, graphs, pictures) (5)

| Graphics used are appropriate and sufficient. | | Graphics used are adequate but could be improved. | | Data are poorly represented by the graphics. |
|---|---|---|---|---|
| 5 | 4 | 3 | 2 | 1 |

Data are used to draw a well-supported conclusion (5)

| Very clear and correct connections are made between data and conclusions | | Connections between data and conclusions are mostly clear and correct. | | Connections between data and conclusions are not clear or well supported |
|---|---|---|---|---|
| 5 | 4 | 3 | 2 | 1 |

**PROJECT PRESENTATION (10 points)**

Clear & thorough explanation of investigation (5)

| | | | | |
|---|---|---|---|---|
| Student offers a clear and thorough explanation of the investigation. | | Student offers a limited but adequate explanation of the investigation. | Insufficient evidence of ability to explain investigation or results. | |
| 5 | 4 | 3 | 2 | 1 |

Neatness & organization (5)

| | | | | |
|---|---|---|---|---|
| Presentation is neat. Organization is clear and effective | | Neatness and organization are adequate but could be improved. | Lack of neatness and/or organization detracts significantly from effectiveness of presentation. | |
| 5 | 4 | 3 | 2 | 1 |

**SCIENCE JOURNAL (10 POINTS)**

A complete informal record of all work related to the project (5)

(Remember: journals are not judged on neatness. Handwritten notes are okay!)

| | | | | |
|---|---|---|---|---|
| Journal shows consistent, appropriately detailed, and relevant entries, made while the work was in progress. | | Journal entries were not made consistently and/or do not give the full story of the investigation. | Journal entries are few, and/or appear to have been created at the last moment. | |
| 5 | 4 | 3 | 2 | 1 |

Clearly written and in student's own words (5)

| | | | | |
|---|---|---|---|---|
| Journal is clear and in the student's own words (consistent with interview). | | Journal is mostly clear and in the student's own words (consistent with the interview). | Journal does not present a clear picture or sound like it is in the student's own words. | |
| 5 | 4 | 3 | 2 | 1 |

**INTERVIEW (10 points)**

Student is present (5)

| | | |
|---|---|---|
| Student is there when you arrive (as appropriate) and remains throughout the interview ☺ | Student is late or needs to be summoned to the interview. | Student was not present to be interviewed. 😐 |
| 5 | 3 | 1 |

Student answers questions related to project (5)

| | | | | |
|---|---|---|---|---|
| Student answers reasonable questions readily, thoughtfully and with accuracy. | | Answers are reasonable but reveal minor gaps in understanding. | Answers reveal a serious lack of understanding of the project. | |
| 5 | 4 | 3 | 2 | 1 |

**Impressive aspects about this project:**

**Suggestions for improvement:**

**ALLIANCE OF NORTH SEATTLE CATHOLIC SCHOOLS**
**2010 MIDDLE SCHOOL SCIENCE FAIR**

# **OFFICIAL ENTRY FORM**

(Entry Forms are due to your School Coordinator by **Friday, *January 25, 2010)***

**Name: _____**

**Grade (circle one): 6 7 8**

**School _____**

**Science Fair Project Title: _____**

**Brief description of Science Fair Project: _____**

_____

_____

_____

**Name of Science Fair Project Partner (If applicable): _____**

***The maximum number of students per science project is 2 (Both students must be in the same grade).*

***Each student is required to submit a Science Fair Project Entry Form & have parental permission to participate in the Science Fair.)*

**PARENTAL PERMISSION** My son/daughter _____has my permission to enter the Alliance of North Seattle Catholic Schools 2010 Middle School Science Fair on Thursday March, 25, 2010 at Bishop Blanchet High School**.**

**We have read the Science Fair Guiding Principles and agree to comply with the contest rules and regulations.**

_____ _____ _____
Parent's Name (printed) Signature Date

_____
Student's Signature